FCC 47 CFR PART 15 SUBPART B

TEST REPORT

For

IPC

Model: ARK-3381; ARK 3382

Trade Name: ADVANTECH

Issued for

Advantech Co., Ltd.
No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Issued by

COMPLIANCE CERTIFICATION SERVICES INC.
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TABLE OF CONTENTS

1 TEST RESULT CERTIFICATION 3

2 EUT DESCRIPTION 4

3 TEST METHODOLOGY 4

3.1 EUT SYSTEM OPERATION 6
3.2 DECISION OF FINAL TEST MODE 6

4 SETUP OF EQUIPMENT UNDER TEST 7

5 FACILITIES AND ACCREDITATIONS 8

5.1 FACILITIES 8
5.2 LABORATORY ACCREDITATIONS AND LISTINGS 9

6 INSTRUMENT AND CALIBRATION 10

6.1 MEASURING INSTRUMENT CALIBRATION 10
6.2 TEST AND MEASUREMENT EQUIPMENT 10

7 LINE CONDUCTED & RADIATED EMISSION TEST 12

7.1 LIMIT…. 12
7.2 TEST PROCEDURE OF LINE CONDUCTED EMISSION 13
7.3 TEST PROCEDURE OF RADIATED EMISSION 15
7.4 TEST RESULTS 17

APPENDIX 1 - PHOTOGRAPHS OF TEST SETUP 25

1 TEST RESULT CERTIFICATION

Applicant:	**Advantech Co., Ltd.** No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.
Manufacturer:	**Advantech Co., Ltd.** No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.
Equipment Under Test:	IPC
Trade Name:	ADVANTECH
Model:	ARK-3381; ARK 3382
Detailed EUT Description:	See Item 2 of this report
Date of Test:	April 18 ~ 28, 2005

Applicable Standard	Class / Limit	Test Result
FCC Part 15 Subpart B	Class A	No non-compliance noted
Deviation from Applicable Standard		
According to applicant's declaration this EUT is a class A product, and to be market in industrial environment only.		

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart B and the measurement procedures were according to ANSI C63.4. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

Approved by:

Kurt Chen
Director of Linkou Laboratory
Compliance Certification Services Inc.

Reviewed by:

Susan Su
Section Manager of Linkou Laboratory
Compliance Certification Services Inc.

2 EUT DESCRIPTION

Product	IPC		
Trade Name	ADVANTECH		
Model	ARK-3381; ARK 3382		
Housing Type	Metal Case		
EUT Power Rating	DCV From Power Adapter		
Power Adapter Manufacturer	LE	**Model**	LE-9702B
Power Adapter Power Rating	I/P: 100-240VAC, 50-60Hz O/P: 12VDC, 4A		
AC Power Cord Type	Unshielded, 1.8m (Detachable) to Power Adapter		
DC Power Cable Type	Unshielded, 1.8m (Non-detachable) with a core at Power Adapter		
HDD Manufacturer	Fujitsu	**Model**	MHT2040AT
Mother Board Manufacturer	ADVANTECH	**Model**	PCM-9300
For ARK-3381			
CPU Manufacturer	Intel	**Model**	1.1GHz
Memory Capacity	512MB		
For ARK-3382			
CPU Manufacturer	Intel	**Model**	1.4GHz
Memory Capacity	384MB		

I/O Port of EUT (For ARK-3381)

I/O Port Type	Q'TY	TESTED WITH
1. Serial Port	7	7
2. PS/2 Keyboard Port	1	1
3. Video Out Port (VGA)	1	1
4. LVDS Port	1	1
5. LAN Port	1	1
6. USB Port	1	1

I/O Port of EUT (For ARK 3382)

I/O Port Type	Q'TY	TESTED WITH
1. Serial Port	2	2
2. PS/2 Keyboard Port	1	1
3. Video Out Port (VGA)	1	1
4. LVDS Port	1	1
5. LAN Port	4	4
6. USB Port	1	1

3 TEST METHODOLOGY

3.1 EUT SYSTEM OPERATION

1. EMI test software was loaded and executed under “Windows XP” environment.
2. A communicated software was loaded and executed to communicate between EUT and remote side.
3. EUT sends and receives data from Notebook PC on remote side via LAN Cable.
4. Data was sent to monitor filling the screen with upper case of “H” patterns.
5. Test program sequentially exercised all related I/O’s of EUT and sent “H” patterns to all applicable output ports of EUT.
6. Repeat step 2 to 5

Note: *Test program is self-repeating throughout the test.*

3.2 DECISION OF FINAL TEST MODE

1. The following test mode(s) were scanned during the preliminary test:

Mode 1
1280 x 1024 Recitation (ARK-3381)

Mode 2
1280 x 1024 Recitation / LAN (ARK 3382)

Mode 3
1024 x 768 Recitation (ARK-3381)

Mode 4
1024 x 768 Recitation (ARK 3382)

Mode 5
800 x 600 Recitation (ARK-3381)

Mode 6
800 x 600 Recitation (ARK 3382)

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

   Mode 1, 2.

Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items.

4 SETUP OF EQUIPMENT UNDER TEST

Setup Diagram

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

(For ARK-3381)

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	959NF	AQ19H2RT706122K	FCC DoC	SAMSUNG	Shielded, 1.8m with two cores	Unshielded, 1.8m
2.	Modem	DM-1414	304012266	IFAXDM1414	ACEEX	Unshielded, 1.5m	Unshielded, 1.5m
3.	Modem	DM-1414	304012267	IFAXDM1414	ACEEX	Unshielded, 1.5m	Unshielded, 1.5m
4.	Modem	DM-1414	304012268	IFAXDM1414	ACEEX	Unshielded, 1.5m	Unshielded, 1.5m
5.	PS/2 Keyboard (one to two adapter)	SK-2800C	N/A	FCC DoC	COMPAQ	Shielded, 1.5m	N/A
6.	PS/2 Mouse (one to two adapter)	M-S69	N/A	FCC DoC	COMPAQ	Shielded, 1.5m	N/A
7.	Mouse	M-MM43	LZE95250096	FCC DoC	Logitech	Shielded, 1.5m	N/A
8.	Mouse	M-MM43	LZE93353074	FCC DoC	Logitech	Shielded, 1.5m	N/A
9.	Mouse	M-MM43	LZE94052791	FCC DoC	Logitech	Shielded, 1.5m	N/A
10.	Mouse	M-MM43	LZE94052771	FCC DoC	Logitech	Shielded, 1.5m	N/A
11.	USB 2.0 External HDD	F12-UF	A0100214-43b0001	FCC DoC	TeraSys	Shielded, 1.5m	N/A
12.	Notebook PC (Remote)	PPT	0932RY	E2K24GBRL	DELL	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m

(For ARK 3382)

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	959NF	AQ19H2RT706122K	FCC DoC	SAMSUNG	Shielded, 1.8m with two cores	Unshielded, 1.8m
2.	PS/2 Keyboard (one to two adapter)	SK-2800C	N/A	FCC DoC	COMPAQ	Shielded, 1.5m	N/A
3.	PS/2 Mouse (one to two adapter)	M-S69	N/A	FCC DoC	COMPAQ	Shielded, 1.5m	N/A
4.	Mouse	M-MM43	LZE95250096	FCC DoC	Logitech	Shielded, 1.5m	N/A
5.	Mouse	M-MM43	LZE93353074	FCC DoC	Logitech	Shielded, 1.5m	N/A
6.	USB 2.0 External HDD	F12-UF	A0100214-43b0001	FCC DoC	TeraSys	Shielded, 1.5m	N/A
7.	HUB (Remote)	DS104	N/A	FCC DoC	NERGEAR	LAN Cable x 4: Unshielded, 10m	Unshielded, 1.8m
8.	Notebook PC (Remote)	PPT	0932RY	E2K24GBRL	DELL	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m

Note: *All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.*

Grounding: *Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.*

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at CCS Taiwan Linkou Lab at No. 81-1, Lane 210, Bade Rd., 2, Luchu Hsiang, Taoyuan Hsien, Taiwan.

The measurement facilities are constructed in conformance with the requirements of CISPR 16-1, ANSI C63.4 and other equivalent standards.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform Electromagnetic compatibility tests are registered or accredited by the organizations listed in the following table which includes the recognized scope specifically.

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP	EN 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS CISPR 22, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	NVLAP Lab. Code:200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 93105, 90471
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-393/1066/725/879/1868 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	N ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1, EN 300 328-2, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	CNLA 0 3 6 3 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	Canada IC 3991-3 IC 3991-4

Note: *No part of this report may be used to claim or imply product endorsement by CNLA, NVLAP or other government agency.*

6 INSTRUMENT AND CALIBRATION

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

6.2 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and other equivalent standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manual.

Equipment Used for Emission Measurement

Conducted Emission Test Site # 4				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCS30	847793/012	12/27/2005
LISN	EMCO	3825/2	9003-1628	07/26/2005
LISN	R&S	ENV 4200	830326/016	03/30/2006

Note: *The measurement uncertainty is less than +/- 2.83dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

Open Area Test Site # 2				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	ADVANTEST	R3261A	21720279	N.C.R
EMI Test Receiver	R&S	ESVS10	834468/006	04/06/2006
Pre-Amplifier	HP	8447D	2944A08780	07/14/2005
Bilog Antenna	Sunol Sciences	JB1	A111203	12/24/2005
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
RF Switch	ANRITSU	MP59B	M76890	N.C.R
Site NSA	CCS	N/A	N/A	08/13/2005

Note: *The measurement uncertainty is less than +/- 3.36dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

3 meter Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	ADVANTEST	R3271A	85060321	10/15/2005
Pre-Amplifier	HP	8449B	3008A00965	10/14/2005
Horn Antenna	EMCO	3115	9602-4659	04/09/2006
Coaxial Cable	ANOREW	LDF-2-50	79027	10/13/2005
Turn Table	HD	HD320	N/A	N.C.R
Antenna Tower	HD	MA 240	N/A	N.C.R
Controller	HD	HD 100	N/A	N.C.R

7 LINE CONDUCTED & RADIATED EMISSION TEST

7.1 LIMIT

Maximum permissible level of Line Conducted Emission

Frequency (MHZ)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: *The lower limit shall apply at the transition frequency.*

Maximum permissible level of Radiated Emission measured at 10 meter

Frequency (MHZ)	Class A (dBuV/m)	Class B (dBuV/m)
	Quasi-peak	Quasi-peak
30 – 230	40	30
230 - 1000	47	37

Note: *The lower limit shall apply at the transition frequency.*

Maximum permissible level of Radiated Emission measured at 3 meter

Frequency (MHZ)	Class A (dBuV/m)		Class B (dBuV/m)	
	Average	Peak	Average	Peak
Above 1000	59.3	79.3	53.9	73.9

Note: *The lower limit shall apply at the transition frequency.*

7.2 TEST PROCEDURE OF LINE CONDUCTED EMISSION

Procedure of Preliminary Test

- The EUT was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- The test equipment EUT installed received AC power, 120VAC/60Hz, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment received power from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a EMI Test Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to the Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Receiver.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per step 10 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the AV. limit in Q.P. mode, then the emission signal was re-checked using an AV. detector.
- The test data of the worst-case condition(s) was recorded.

Data Sample:

Freq. (MHz)	Q.P. Raw (dBuV)	Average Raw (dBuV)	Q.P. Limit (dBuV)	Average Limit (dBuV)	Q.P. Margin (dB)	Average Margin (dB)	Note
x.xx	43.95	---	73.00	60.00	-29.05	---	L1

Freq. = Emission frequency in MHz
Raw dBuV = Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB
Limit dBuV = Limit stated in standard
Margin dB = Reading in reference to limit
Note = Current carrying line of reading
"---" = The emission level complied with the Average limits, with at least 2dB margin limits, so no further recheck.

Calculation Formula

Margin (dB) = RAW (dBuV) – Limit (dBuV)

7.3 TEST PROCEDURE OF RADIATED EMISSION

Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC power source, 120VAC/60Hz, from the outlet socket under the turntable. All support equipment received power from another socket under the turntable.
- The antenna was placed at 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz maximum, if any. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

- EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz maximum, if any. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- The test data of the worst case condition(s) was recorded.

Data Sample:

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
xx.xx	14.00	12.20	26.20	40.00	-13.80

Freq. = Emission frequency in MHz
Raw Data (dBuV) = Uncorrected Analyzer / Receiver reading
Corr. Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Emiss. Level (dBuV/m) = Raw reading converted to dBuV/m and CF added
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Reading in reference to limit
P = Peak Reading
Q = Quasi-peak Reading
A = Average Reading

Calculation Formula

Margin (dB) = Emiss. Level (dBuV/m) – Limits (dBuV/m)
Emission Level (dBuV/m) = Raw Data (dBuV) + Corr Factor (dB/m)

7.4 TEST RESULTS

Line Conducted Emission

Model: ARK-3381 **Test Mode:** Mode 1

Temperature: 25°C **Humidity:** 58% RH

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	NOTE
8.081	31.50	---	73.00	60.00	-41.50	---	L1
8.593	31.40	---	73.00	60.00	-41.60	---	L1
11.102	29.80	---	73.00	60.00	-43.20	---	L1
13.091	30.10	---	73.00	60.00	-42.90	---	L1
13.549	30.40	---	73.00	60.00	-42.60	---	L1
15.028	28.60	---	73.00	60.00	-44.40	---	L1
8.211	29.70	---	73.00	60.00	-43.30	---	L2
8.719	28.50	---	73.00	60.00	-44.50	---	L2
10.639	29.00	---	73.00	60.00	-44.00	---	L2
13.013	27.10	---	73.00	60.00	-45.90	---	L2
13.401	28.40	---	73.00	60.00	-44.60	---	L2
14.748	27.50	---	73.00	60.00	-45.50	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Note: *"---" denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.*

Line Conducted Emission

Model: ARK 3382 **Test Mode:** Mode 2

Temperature: 28°C **Humidity:** 59% RH

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	NOTE
3.329	38.80	---	73.00	60.00	-34.20	---	L1
3.958	37.30	---	73.00	60.00	-35.70	---	L1
5.451	31.50	---	73.00	60.00	-41.50	---	L1
8.082	32.60	---	73.00	60.00	-40.40	---	L1
8.589	30.10	---	73.00	60.00	-42.90	---	L1
11.101	30.70	---	73.00	60.00	-42.30	---	L1
2.982	39.40	---	73.00	60.00	-33.60	---	L2
4.009	37.60	---	73.00	60.00	-35.40	---	L2
5.443	34.30	---	73.00	60.00	-38.70	---	L2
7.161	27.90	---	73.00	60.00	-45.10	---	L2
9.962	26.50	---	73.00	60.00	-46.50	---	L2
10.130	25.20	---	73.00	60.00	-47.80	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Note: *"---" denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.*

Radiated Emission (A)

Model: ARK-3381 **Test Mode:** Mode 1

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Quasi-peak. **Antenna:** Vertical at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
108.13	25.5	13.4	38.9	40.0	-2.4
147.58	18.9	15.1	34.0	40.0	-6.0
153.86	20.8	14.7	35.5	40.0	-4.5
162.36	11.3	14.3	25.6	40.0	-14.4
378.00	26.0	18.5	44.5	47.0	-2.5
540.15	15.8	22.7	38.5	47.0	-8.5
648.21	14.8	24.4	39.2	47.0	-7.8
702.20	17.1	25.0	42.1	47.0	-4.9
756.19	17.4	25.4	42.8	47.0	-4.2
810.24	15.5	27.5	43.0	47.0	-4.0
864.31	15.0	27.1	42.1	47.0	-4.9
918.14	12.6	28.0	40.6	47.0	-6.4
972.14	15.1	28.8	43.9	47.0	-3.1

Radiated Emission (B)

Model: ARK-3381 **Test Mode:** Mode 1

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Quasi-peak. **Antenna:** Horizontal at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
108.06	22.8	13.4	36.2	40.0	-3.8
144.10	21.0	15.3	36.3	40.0	-3.7
162.05	25.3	14.3	39.6	40.0	-2.4
216.01	25.7	14.1	39.8	40.0	-2.1
378.07	26.0	18.5	44.5	47.0	-2.5
399.81	11.9	18.8	30.7	47.0	-16.3
410.60	13.7	19.1	32.8	47.0	-14.2
432.26	12.9	19.8	32.7	47.0	-14.3
487.26	14.0	21.3	35.3	47.0	-11.7
864.27	15.6	27.1	42.7	47.0	-4.3
918.31	13.4	28.0	41.4	47.0	-5.6
972.33	9.0	28.8	37.8	47.0	-9.2

Radiated Emission (A)

Model: ARK 3382 **Test Mode:** Mode 2

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Quasi-peak. **Antenna:** Vertical at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
108.05	24.7	13.4	38.1	40.0	-1.9
162.02	23.4	14.3	37.7	40.0	-2.3
171.84	23.7	14.1	37.8	40.0	-2.2
199.35	22.8	14.7	37.5	40.0	-2.5
365.56	20.3	18.4	38.7	47.0	-8.3
498.57	23.0	21.7	44.7	47.0	-2.3
697.91	16.2	25.0	41.2	47.0	-5.8
756.29	13.4	25.4	38.8	47.0	-8.2
797.54	13.7	27.5	41.2	47.0	-5.8
816.27	9.2	27.4	36.6	47.0	-10.4
996.90	8.1	29.1	37.2	47.0	-9.8

Radiated Emission (B)

Model: ARK 3382 **Test Mode:** Mode 2

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Quasi-peak. **Antenna:** Horizontal at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
332.44	22.2	17.4	39.6	47.0	-7.4
365.66	19.9	18.4	38.3	47.0	-8.7
432.66	24.0	19.8	43.8	47.0	-3.2
487.25	21.8	21.3	43.1	47.0	-3.9
498.47	18.4	21.7	40.1	47.0	-6.9
564.97	9.6	23.0	32.6	47.0	-14.4
631.02	18.2	24.0	42.2	47.0	-4.8
668.02	15.4	24.6	40.0	47.0	-7.0
972.02	11.8	28.8	40.6	47.0	-6.4

Radiated Emission – Above 1GHz (A)

Model: ARK-3381 **Test Mode:** Mode 1

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Pk/ A.V. **Antenna:** Vertical at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (Pk) (dBuV/m)	Limit 3m (Pk) (dBuV/m)	Margin (dB)
3483.33	40.84	0.32	41.16	79.30	-38.14
4191.67	40.17	2.64	42.81	79.30	-36.49
5500.00	39.50	4.73	44.23	79.30	-35.07
6600.00	41.00	5.71	46.71	79.30	-32.59
7175.00	39.67	7.00	46.67	79.30	-32.63
7558.33	40.17	7.87	48.04	79.30	-31.26

Note: *In case of peak reading complied with the limit at least 22dB margin, no measurement with A.V. detector required.*

Radiated Emission – Above 1GHz (B)

Model: ARK-3381 **Test Mode:** Mode 1

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Pk/ A.V. **Antenna:** Horizontal at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (Pk) (dBuV/m)	Limit 3m (Pk) (dBuV/m)	Margin (dB)
2896.67	41.17	-1.71	39.46	79.30	-39.84
3908.33	39.00	2.24	41.24	79.30	-38.06
4541.67	40.17	2.68	42.85	79.30	-36.45
5408.33	39.34	4.53	43.87	79.30	-35.43
6508.33	39.17	5.51	44.68	79.30	-34.62
7675.00	39.84	8.00	47.84	79.30	-31.46

Note: *In case of peak reading complied with the limit at least 22dB margin, no measurement with A.V. detector required.*

Radiated Emission – Above 1GHz (A)

Model: ARK 3382 **Test Mode:** Mode 2

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Pk/ A.V. **Antenna:** Vertical at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (Pk) (dBuV/m)	Limit 3m (Pk) (dBuV/m)	Margin (dB)
1833.33	48.67	-5.51	43.16	79.30	-36.14
4083.33	39.50	2.65	42.15	79.30	-37.15
5200.00	38.84	4.09	42.93	79.30	-36.37
5391.67	39.50	4.50	44.00	79.30	-35.30
6650.00	39.84	5.82	45.66	79.30	-33.64
7650.00	40.17	7.97	48.14	79.30	-31.16

Note: *In case of peak reading complied with the limit at least 22dB margin, no measurement with A.V. detector required.*

Radiated Emission – Above 1GHz (B)

Model: ARK 3382 **Test Mode:** Mode 2

Temperature: 23°C **Humidity:** 56% RH

Detector Function: Pk/ A.V. **Antenna:** Horizontal at 10m

Tested by: Carl Chang **Test Results:** Pass

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (Pk) (dBuV/m)	Limit 3m (Pk) (dBuV/m)	Margin (dB)
3700.00	40.00	1.29	41.29	79.30	-38.01
3916.67	40.00	2.28	42.28	79.30	-37.02
4175.00	40.34	2.64	42.98	79.30	-36.32
4866.67	39.84	3.38	43.22	79.30	-36.08
6116.67	40.00	5.27	45.27	79.30	-34.03
7675.00	39.67	8.00	47.67	79.30	-31.63

Note: *In case of peak reading complied with the limit at least 22dB margin, no measurement with A.V. detector required.*

APPENDIX 1 - PHOTOGRAPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST

Mode 1

Mode 2

RADIATED EMISSION TEST

Mode 1

Mode 2